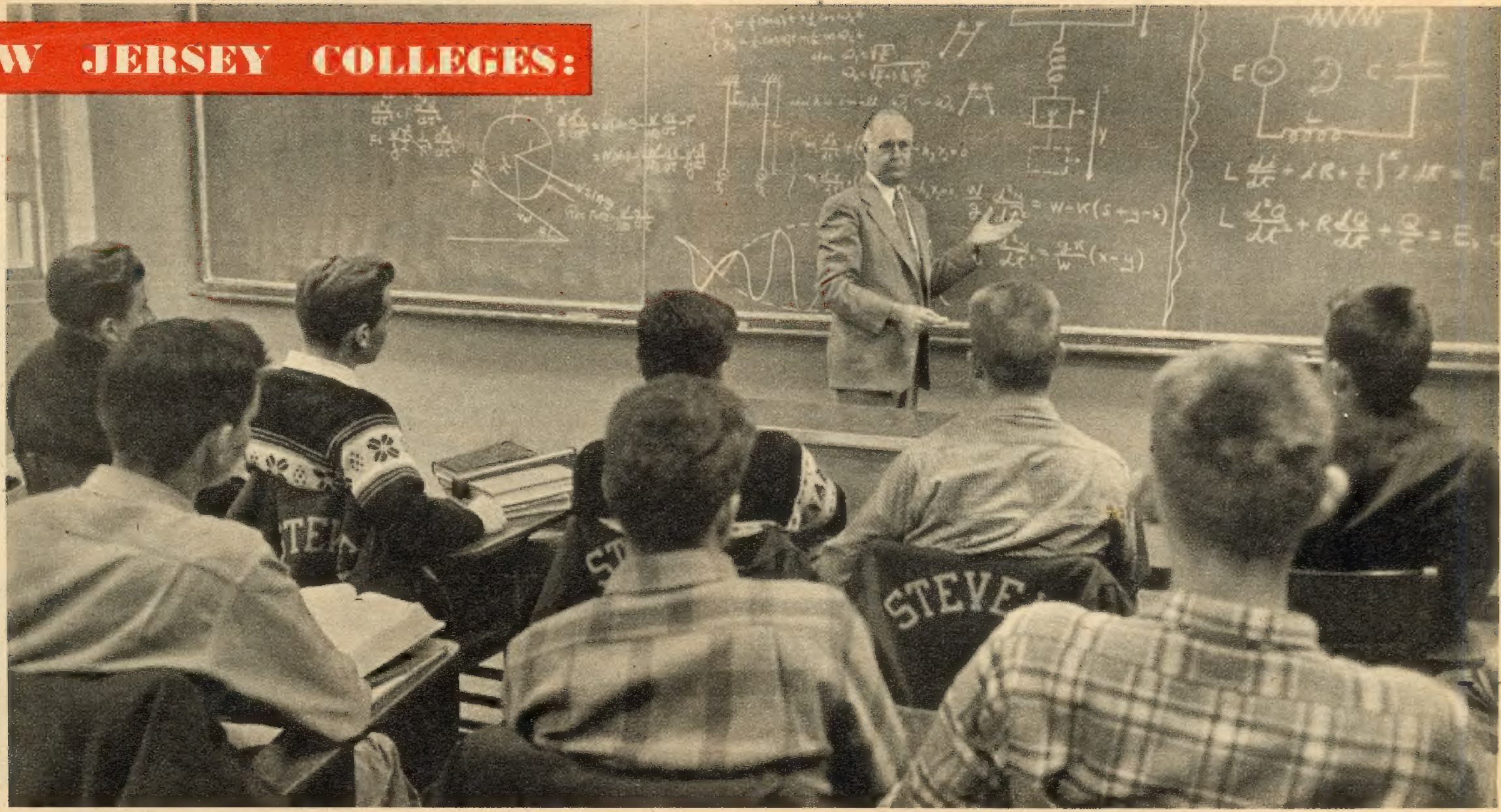


N.J. Colleges & U. (Cunningham)

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NEW JERSEY COLLEGES:



By JOHN T. CUNNINGHAM

HIGH on a weathered bluff of green serpentine rock overlooking the broad Hudson River, Stevens Institute of Technology stands in academic serenity, surveying an area where all the frantic 20th century sights and sounds and surface confusion blend into a sort of technological order.

Probably no founder of an engineering college today would choose Hoboken as the site. Yet where better to locate an engineering college than on a rise above teeming railroad yards and busy piers and crowded streets and clanking machines and towering skyscrapers and chugging tugs? These are the spawn of technology; these are better scenery and better sounds for potential engineers than snow-capped mountains and chirping crickets.

Happily, nevertheless, Stevens has enough acreage on the bluff to give it roominess despite the teeming surroundings. Encircled by unparalleled engineering opportunity and secure on a fine campus, Stevens has one more precious asset—and this is perhaps the most vital of all: It owns the name and the heritage of New Jersey's greatest engineering family.

THAT may be why Stevens seems unruffled despite the present intense national hunt for engineers and despite

the frenzied thought held by many that onrushing technological progress might render most engineering knowledge obsolete.

The Stevens basic academic method hasn't changed materially since founding days in 1870. The content of the curriculum has been amended, obviously, to keep pace with onrushing science, but the method has never been forsaken. Today, as in the beginning, Stevens gives only one degree—that of Mechanical Engineer. All undergraduates take one course, emphasizing the scientific and mathematical fundamentals underlying all engineering rather than the techniques of one branch alone.

One administrator of the college puts it this way: "Our graduates leave here with three assets: They are flexible, they know how to work like the devil and they don't think they know it all." In short, Stevens stresses fundamentals and its graduates succeed in virtually any engineering assignment—just as a football player who has been taught the fundamentals of blocking and tackling and running is welcomed by any coach anywhere, whether the coach uses a T-formation, a single wing attack or his own brand of dippy-doodle.

This matter of individual flexibility can be traced back all the way to the

In the split-T or splitting the atom, single wing or swept wing, it's fundamentals that count for these Stevens undergraduates attending one of classroom sessions which prepare them for careers.

VERSATILE ENGINEERS

*Stevens Institute of Technology Graduates,
Well-Grounded in Scientific and Mathematical
Fundamentals of All Branches of Engineering,
Go Out Into World With Three Assets—
Flexibility, 'Workability' and 'Learnability'*

versatile Stevens family, responsible for noted contributions to railroads, steamboats, vehicular tunnels, water systems and to so many other engineering areas. Col. John Stevens brought his family to Hoboken in 1794, when Castle Point was an idyllic spot. There the Stevenses lived and invented and prospered and there the name is perpetuated.

SOME say that despite his many engineering feats Col. John's greatest contributions to posterity were his

sons Robert and Edwin. Robert inherited the inventive genius of the colonel, but Edwin, although a good engineer, showed especial aptitude for handling family finances. Thus it was Edwin who left a block of Hoboken land and \$650,000 to found a college after his death in 1868.

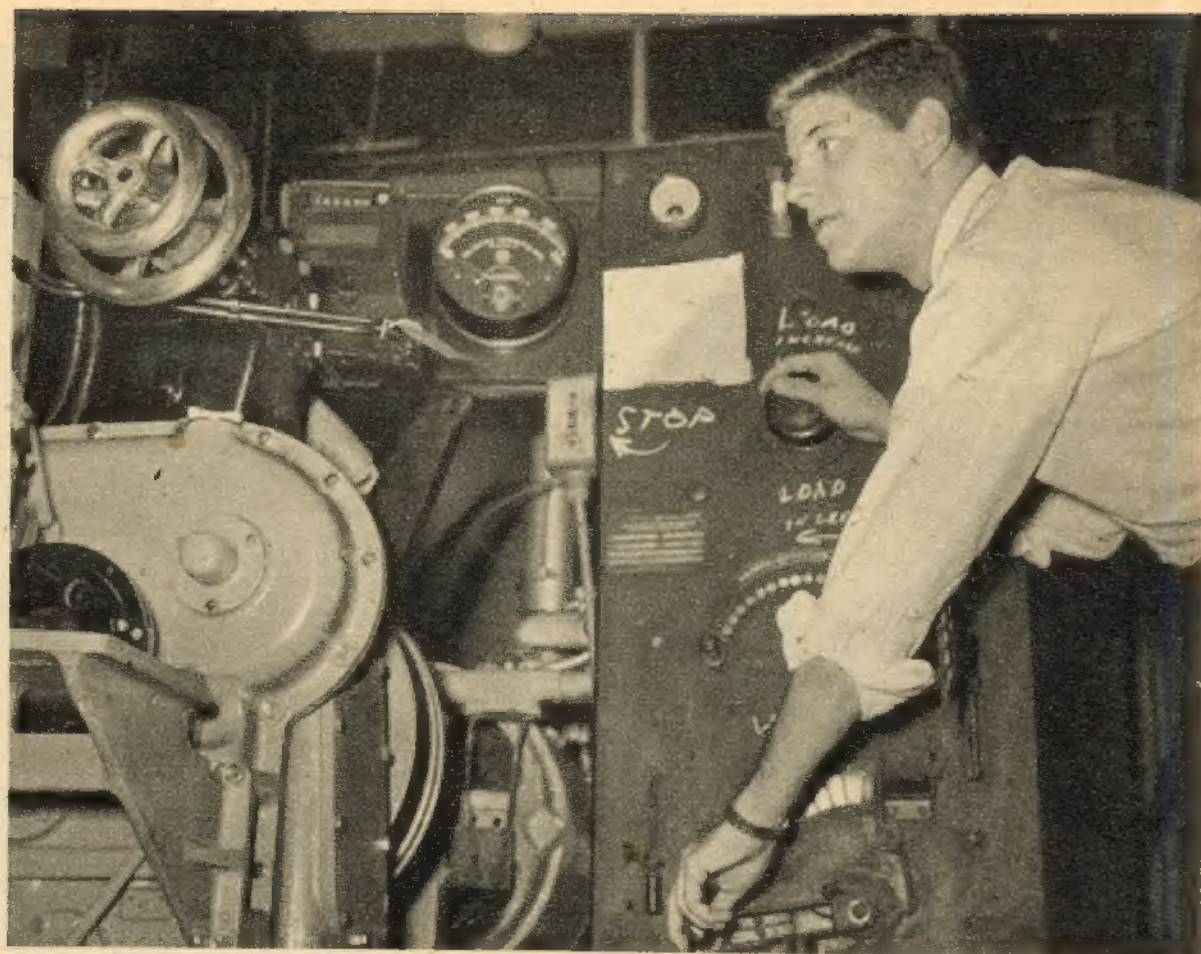
No frills for Edwin Stevens: he asked only a "plain" building, of something "as substantial and economical as trap rock." The architect couldn't resist touching in a tall central tower in his plans. Edwin's trustees promptly

This is the eighth of a series of articles which not only describe New Jersey's colleges and universities, but tell the story of the growth and traditions of individual colleges within the state, picture their roles in modern education and explain how they plan to meet what has been called "an impending tide of students."

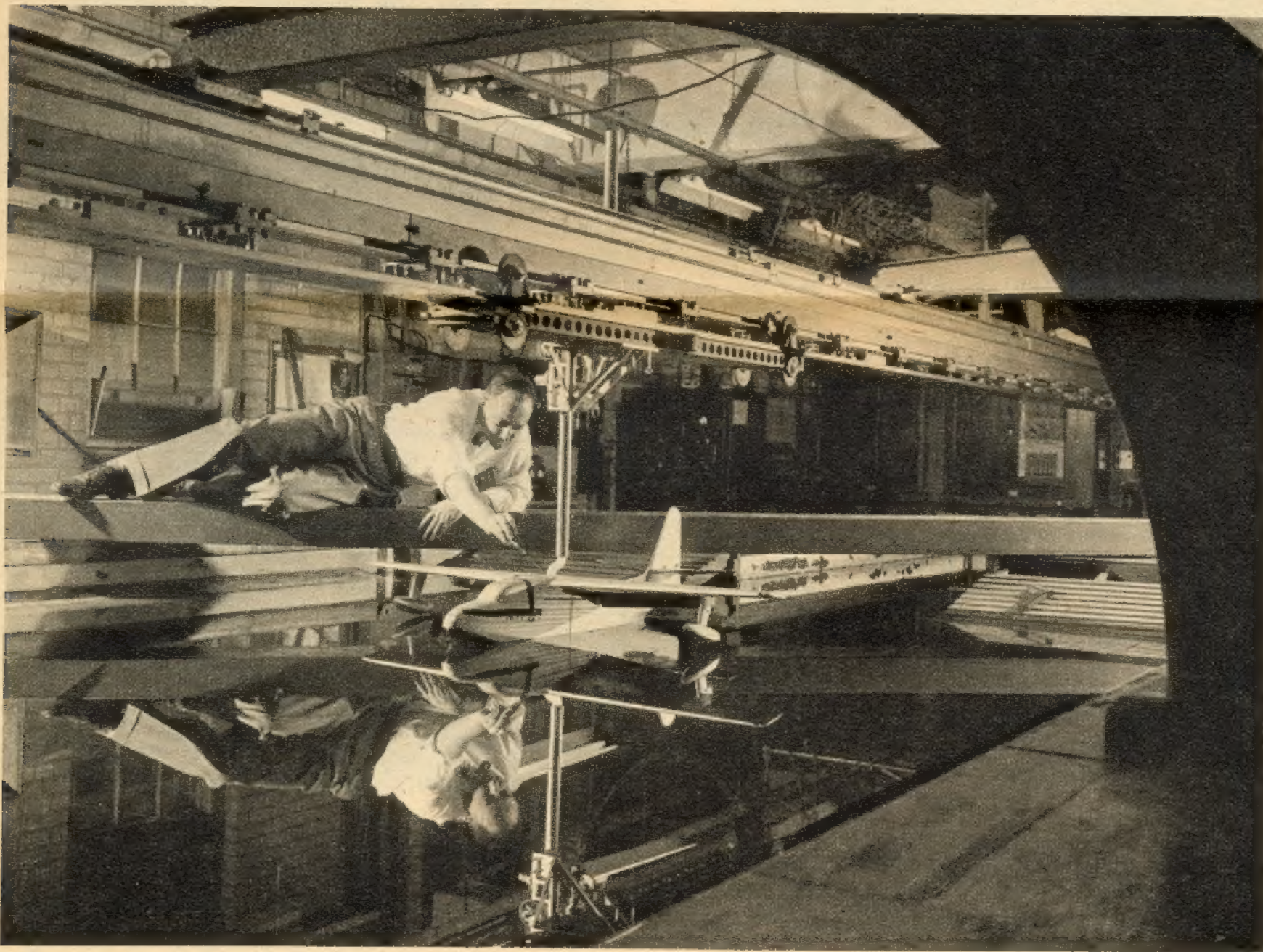
Next Sunday: Upsala College.



In powder metallurgy laboratory, Don Ferris of Cedar Grove adjusts a sintering furnace as Henry Guendel, Hoboken, works control panel. **BELOW:** Experimental Towing Tank Laboratory, used in research on ship design from sailboats to submarines and water-based aircraft.



Fuel research on Diesel engine unit is conducted by Edward Swihura, Bloomfield, at Carnegie Laboratory of Engineering endowed by the wealthy Pittsburgh steelman and philanthropist, Andrew Carnegie.



cut it out and erected a plain building—of trap rock, naturally. Students quickly dubbed it "The Old Stone Mill."

When it came to curriculum the trustees tossed their conservatism to the breezes. Edwin never said what kind of a college he wanted but his trustees decided on a school of mechanical engineering, the only such school ever projected to that time. Until 1870 the only kinds of engineers were military and civil; the trustees planned a school of mechanical engi-

neering only "against the advice of educators and practical men."

Up from the University of Pennsylvania as first president came Dr. Henry A. Morton, professor of chemistry. Dr. Morton believed in "general training," and from that day in 1871 when students first trekked into the "Old Stone Mill" until this the philosophy of general fundamental preparation has never been abandoned—come electricity or electronics, come atomic power or jet propulsion.

In June 1873 one J. Augustus Hen-

derson stepped up before Dr. Morton to receive his degree in mechanical engineering—the first man ever to receive the legal degree of Mechanical Engineer. When Dr. Morton died in 1902 nearly 1,000 more men had received the same degree. Today some 6,000 Stevens men have been graduated—every one firmly linked to Mr. Henderson by the identical degree he received.

IN getting its enduring academic course under way, Stevens Institute of

Technology had good fortune in both the capability and longevity of its presidents. Until Dr. Jess Harrison Davis, incumbent president, assumed office in 1951 Stevens had been governed by only three presidents in its first 81 years.

Each of those three presided over distinct episodes in the long Stevens story. Dr. Morton, president from 1870 until 1902, served during the vital formative years. Dr. Alexander C. Humphreys led the way in campus expansion and in introducing engineering economics to America in his term from 1902 to 1927. Dr. Harvey N. Davis (no relation to the current president) used his term from 1928 to 1951 to strengthen the traditional Stevens emphasis in the humanities and to broaden the Stevens program of graduate education and research.

Dr. Morton moulded Stevens into its enduring form. He stressed a thorough knowledge of tools and machines and shop practices, but he declared himself in favor of graduating "not journeymen mechanics but mechanical engineers." He also emphasized cultural knowledge—so Stevens men would be "fit to associate on terms of equality with other educated men."

THE struggling little institute adopted the Stevens family motto, "Per Aspera ad Astra" ("through adversity to the stars"). Dr. Morton seemed to accept it as a personal challenge. He saw the college on the bluff through the adversity of its first three decades—contributing sums of money equivalent to all the salary he collected in his 32-year tenure! Finally he reached a star, wealthy steelman and philanthropist Andrew Carnegie.

Carnegie first gave \$65,000 toward a new laboratory building and at its dedication in 1902 said bluntly his gift was not "a thing of chance, not a whim; I gave it because of my experience with what Stevens men are doing." The day after the dedication (as

(Continued on Following Page)



Castle Stevens, the Institute's first dormitory, now a social center, was built by founder Edwin Stevens in 1854. Campus view (left) shows it occupying summit of promontory overlooking Hoboken docks and mid-Manhattan skyline. Long-roofed structure flanking playing field locates Towing Laboratory with "Old Stone Mill" in right foreground. Latter building (also shown in closeup below) housed all activities for first quarter century. It's now the Administration Building.

STEVENS INSTITUTE of TECHNOLOGY

(Continued From Preceding Page)

the Carnegie Laboratory of Engineering), the Pittsburgh Scot sent Dr. Morton a check for \$100,000 and soon after added another \$125,000.

Dr. Morton never let scientific grass grow under his feet. Naval men sought to develop bigger and better ships; Dr. Morton in 1882 added a department of marine engineering. Thomas A. Edison proved the power potential of electricity; Dr. Morton started a department of applied electricity in 1883. Growing America found need to expand its chemical know-how; Dr. Morton founded the department of analytical chemistry in 1886.

Three young Stevens graduates helped lead the way into the 20th century revolution of mass production. George Mead Bond, class of '80, built a comparator in 1881 and thus assured conformity of all measuring devices to government standards. This permitted the interchangeability of parts—the key to mass production. Frederick Winslow Taylor, class of '83, and Henry L. Gantt, class of '84, originated the concept of scientific management—the very basis of modern plant efficiency.

WHEN Dr. Morton died in 1902 Stevens Institute of Technology chose as his successor a graduate and brilliantly successful industrialist. He was Dr. Alexander Crombie Humphreys, class of '81, and a national leader in the then mushrooming cooking gas industry.

Dr. Humphreys did for Stevens what he had done for gas. He inspired gifts of \$4,500,000 in his 25-year presidency. He expanded the campus from the original "Old Stone Mill" by building Morton Memorial Laboratory of Chem-

istry and by purchasing the old Stevens estate on the hill behind the Gates. On that hill he built William Hall Walker Gymnasium in 1916 and there he laid out the athletic fields. After World War I he bought two adjacent and substantial war-emergency buildings and converted them into the present library and Navy Building (one of the main classroom and laboratory structures on campus).

Material expansion didn't obsess Dr. Humphreys. Subtly he updated the Stevens' education, making his greatest academic contribution by introducing what he called "economics for engineers." He felt industrial engineering leaders had to know dollars and cents as well as common sense. Careers in engineering already had begun to veer from the old status of "engineers in overalls" to the new prestige of "engineers in white collars."

STEVENS chose a noted Harvard educator as its third president in 1928 when Dr. Harvey N. Davis came to Hoboken from Cambridge. Dr. Davis founded the evening graduate school in 1930 to permit men to intensify their knowledge in one specific engineering area. He also started a series of research programs, embracing many fields from smoke abatement to powder metallurgy—and featuring above all else the famed Experimental Towing Tank Laboratory.

One small tank in the Navy Building sufficed when the hydrodynamic research started in 1935. Today, Stevens has three tanks, and in the long, low building flanking the athletic fields Stevens' research engineers probably handle as diversified a range of naval design problems as any lab-



oratory in the world. The laboratory first tested the hulls of yachts but has advanced to tackle such problems as the hull for the new USS Albacore (the Navy's new research submarine) and the design of the revolutionary new Martin SeaMaster, 600-mile-an-hour Navy jet bomber.

Like all his predecessors, Dr. Harvey Davis also recognized the need for fitting Stevens men for the broader life. Accordingly, in 1929 he established at Stevens a department of humanities, the first such department ever organized in an engineering school—but entirely in keeping with Dr. Morton's old beliefs that his students must get cultural as well as scientific understanding.

Depression and war rode over the bluff for most of Dr. Davis' regime

but he found funds to change the face of the campus. First of all, in the depressed 1930s he built two dormitories, Jacobus and Palmer halls, on the upper campus. Later, in the 1940s, he acquired four houses along Castle Point Ter. for use as dormitories. For the first time, Stevens had adequate dormitory facilities—and thanks in large measure to Dr. Davis, about 400 of the 950 undergraduates now live on campus.

During the war Dr. Davis improved the Towing Laboratory building and the powder metallurgy facilities. Then, amid the postwar hustle and bustle, he acquired several nearby buildings for dormitory and laboratory use, built the Mott Fieldhouse and moved toward the refurbishing of century-old Castle Stevens on the bluff. Above



Lacrosse workout at Stevens, which has played the game continuously since 1884 and is famous for its teams. RIGHT: Empty instructor's desk symbolizes the college honor system during an examination.



all, in 1948 Dr. Davis acquired funds to add both the Peirce Laboratory of Metallurgy and the Kidde Laboratory of Physics.

So Stevens acquired through the terms of three presidents the sound material face its 31-acre campus now presents to visitors—from the time-worn and still decidedly plain "Old Stone Mill" to the splendid dormitory facilities and broad playing fields up the hill on Castle Point.

AS the institute built its firm academic traditions, undergraduates built their traditions, too. Stevens men have wide freedom in determining their own destinies. In class, for example, every institute examination since 1906 has been conducted under the honor system. Every after-class activity is of the students, by the students and for the students—with no faculty help or advice unless it's sought. The plan has worked splendidly. Despite the rigorous study program and its many commuting students, Stevens has heavy after-class participation.

Stevens has regularly assigned sports coaches—who stay on as faculty members year in and year out regardless of victories or defeats. Few big-name athletes ever choose Stevens for almost obvious scholastic reasons. Yet the Cardinal and Gray teams of Stevens are successful even though varsity representations often are men who learned their techniques after coming to the bluff.

Once Stevens played football, and played it brilliantly. Its 1883 team won 11 and lost none and the 1885 eleven walloped City College of New York, 162-0. In recent times Stevens had undefeated gridiron clubs in 1917, 1919 and 1920, before the pressures of collegiate football led to abandonment. Today Stevens is best known for its great lacrosse teams, and lacrosse has been played continuously on the bluff since 1884—longer than at any other American college.

BUT the main reason for a young man wending his way to Stevens Institute of Technology is because the

85-year-old engineering college offers a splendid education. How to keep it that way in the face of tremendous demands for engineers and in the face of demands of a decade or two hence is the problem of the fourth Stevens president, Jess Harrison Davis.

Stevens' trustees reached out to Clarkson College of Technology to pick Jess Davis as the successor to Harvey Davis in 1951. Dr. Davis had been at Clarkson since 1929, had been president since 1948. If he found Hoboken somewhat less quiet than Potsdam, N.Y., Dr. Davis found a firmly settled institution—but an institution sharing with all engineering colleges the disturbing problems wrought by modern scientific advancement.

"We've got to resurvey to be sure we are up to date," says Dr. Davis. "All engineering colleges must. We've had such tremendous changes in the last 10 or 15 years, some of them fundamental."

That means some changing emphases in various parts of the Stevens curriculum—nuclear physics and electronics are emphasized, by way of illustration. Nevertheless, the basic Stevens program of one degree and one course of general engineering study for all students will remain unchanged. Fundamentals are unchangingly necessary.

Dr. Davis sees it this way: "You don't make any kind of an engineer, be it civil or chemical or any other kind, until you first make an engineer. In the same sense you can't make a corporation lawyer until you first make a lawyer. The present emphasis on research doesn't change our viewpoint; research requires more—not less—knowledge of fundamentals."

IT seems that by emphasizing fundamentals, tempered by changing times and expanding knowledge, the 85-year-old Stevens program gets ever younger rather than older. It's as if the founders discovered a fountain of engineering youth.

Every Stevens graduate gets an intensive briefing on what to look for in a job. Every junior takes a "careers"

course to acquaint him with the roles of engineers in various types of industry. Then, each fall, every senior takes an extended week-long trip through industrial plants in various sections of the country. This, incidentally, isn't new, either: the first such Stevens jaunt took place in the fall of 1880!

Stevens alumni through the years have made notable contributions to science and engineering, but so basic is the education that it has been useful to graduates who have heard other callings—as ministers, lawyers and doctors and artists. A Stevens graduate became the ophthalmologist who set up the "eye bank." John Marin, noted water color artist, and Alexander Calder, who invented mobiles, received their education at Stevens.

As mentioned, Stevens stresses work in the humanities; that gives a man breadth, or, as Dr. Davis points out, "gives an engineer, who looks at things quantitatively, the chance to look at the world about him qualitatively." That accounts for breadth. How is depth achieved? Dr. Davis replies with a smile: "By making our program tough."

THE schedule is tough, right enough. There are those (engineers, of course) who claim an engineering course is tougher than a medical course any day. A Stevens man becomes an engineer in two steps. First, in his freshman and sophomore years he studies the underlying mathematics and science fundamental to all engineering. Secondly, in his last two years he learns how the knowledge is applied in five major engineering fields. A senior may, through studying elective courses, pursue advanced study in the field of science or engineering which interests him most.

Dr. Davis wants Stevens to remain small, somewhere between 1,000 and 1,200 students. "We think there are distinct advantages in a small college," he explains. "We have no desire to get into mass education. We would rather do a good job with a small number of people than a poor job with a large number." Nevertheless, pressure



Dr. Jess Harrison Davis, fourth president of the 85-year-old Stevens Institute of Technology.

mounts at Stevens. Last fall's entering freshman class reached an all-time high of 363 men. Only one applicant in four can be accommodated now.

Needed soon to keep campus laboratory facilities attuned to changing scientific times are a new and larger building for chemistry and chemical engineering courses and a building for electrical engineering and physics courses. Additional laboratory space is needed for the courses in mechanical engineering. As science speeds along, so must engineering colleges—particularly one like Stevens where students are given a fundamental knowledge of practically all engineering.

In Hoboken where John Stevens and his boys labored and saved stands their monument; fortunate indeed is posterity that the monument is something so alive as forward-moving Stevens Institute of Technology (never, they might well caution on the bluff, to be called S.I.T.).